

REMARKS

I. Status of the Application

Claims 1-8 and 10-21 are pending in this application. In the September 16, 2005 office action, the Examiner:

- A. Rejected claim 1 under 35 U.S.C. § 112, second paragraph as allegedly being indefinite;
- B. Rejected claims 1-4, 10-13 and 16 under 35 U.S.C. § 103(a) as allegedly being anticipated by U.S. Patent No. 5,940,009 to Loy et al. (hereinafter "Loy") in view of U.S. Patent No. 5,488,565 to Kennon et al. (hereinafter "Kennon");
- C. Rejected claims 17-21 under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Patent No. 5,488,565 to Kennon et al. (hereinafter "Kennon");
- D. Deemed claims 5-8 and 14-15 allowable if rewritten in independent format.

In this response, claims 1, 5 and 10 have been amended to further particularly point out and distinctly claim the inventive subject matter. Claims 8 and 20 have been canceled, without prejudice. New claims 22 and 23 has been added. Applicants respectfully traverse the rejections of the claims in view of the foregoing amendments and the following remarks.

II. The Indefiniteness Rejection of claim 1 Should be Withdrawn

The Examiner rejected claim 1 as allegedly being indefinite. The Examiner correctly observed that the certain elements of claim 1 lacked antecedent basis. This error arose from an inadvertent omission of *one of the original elements* of claim 1 in a recent amendment. In particular, claim 1 as filed included a limitation directed to a "service disconnect switch", which

was inadvertently omitted from the amended claim 1 in the Listing of Claims of the January 7, 2005 Response to Office Action.

Claim 1 has been amended to restore this element. There was never any intention to delete the “service disconnect switch” from claim 1. As a consequence of restoring this element to claim 1, it is respectfully submitted that the indefiniteness rejection of claim 1 is moot and should be withdrawn.

III. Claim 1 is Not Obvious

Claim 1 stands rejected as allegedly being obvious over Loy and Kennon. Applicants have amended claim 1 in part to remove limitations relating the isolation device. Such limitations had been added by amendment in the January 7, 2005 Response to Office Action. Claim 1 has currently been amended to reflect that a *single* voltage detection signal is generated “based on a first voltage on the first feeder line *and* a second voltage on the second feeder line”. As will be discussed below, neither Loy nor Kennon, either alone or in combination, teach or suggest all the elements of claim 1 as amended.

A. The Present Invention

Claim 1, as amended, is directed to an apparatus for determining tampering in an electricity meter arrangement. The arrangement includes a voltage sense circuit and a processing circuit. The voltage sense circuit is coupled to sense voltage on the first and second feeder lines, and is operable to generate a voltage detection signal based on a first voltage on the first feeder line and a second voltage on the second feeder line. The voltage detection signal is a *single* signal representative of whether line voltage from the electrical power lines is present on the first

and second feeder lines. In the disclosed embodiment, this is carried out using a differential measurement of the feeder line voltages. (See Application at Figs. 1 and 7).

Referring again generally to claim 1, the processing circuit is operably connected to the voltage sense circuit to receive the voltage detection signal. The processing circuit is operable to selectively generate a tamper flag based on whether the characteristic of the voltage detection signal indicates the presence of voltage on the first and second feeder lines when the service disconnect switch has disconnected the electrical power lines from the first and second feeder lines.

Accordingly, a single voltage detection signal provides information regarding whether voltage is present on two separate feeder lines. Claim 1 as originally filed had essentially the same intended scope. The amendments herein merely clarify what was originally intended. The advantages of this aspect of the invention are set forth in the Specification as filed at page 16, which states:

The above described meter 100 also provides an improved tamper protection system that requires few connections to the digital processing circuitry. . . . In particular, by generating a single voltage detection signal based on the measurement of multiple feeder lines, fewer inputs in a digital device need to be dedicated to the operation of that circuit.

(Specification at p.16, lines 2-6) (emphasis added). Even if fewer inputs is not a desired goal, there are other advantages to using a single signal to provide information regarding the presence of voltage on multiple feeder lines, such as conservation of circuit elements and cost.

B. Loy

Loy is directed to a tamper detection device for a meter. Loy includes a voltage sensing circuit 110 coupled to the load side of the power lines as shown in Fig. 2. The voltage sensing circuit 110 is shown in further detail in Fig. 3. As shown in Fig. 3, the voltage sensing circuit

obtains a separate detection signal for each feeder line. In other words, Loy shows to feeder lines 20C and 20D and two corresponding detection signals provided to inputs L1 LOGIC INPUT and L2 LOGIC INPUT. (Loy at Fig. 3).

C. Kennon

Kennon is directed to tamper detection in load management terminals. In one embodiment, Kennon obtains a measure of the voltage differential over the terminals of a disconnect relay. The disconnect relay is intended to disconnect loads from the power line. The measure of the voltage differential on the terminals provides the information discussed below.

If the disconnect relay is closed, then no voltage drop is measured between its terminals. If the disconnect relay is open, then absent tampering, a significant voltage drop is measured between its terminals. However, if the disconnect relay is open, but tampering in the form of a by-pass connection is provided, then there no voltage drop is measured between the terminals even though the relay is open.

D. Neither Loy nor Kennon Teach the Voltage Detection Signal as Claimed

Loy does not teach a voltage sense circuit that is operable to generate a single voltage detection signal that provides a measurement regarding the presence of voltage on both a first feeder line and a second feeder line. As plainly shown in Figs. 2 and 3 of Loy, the voltage sense circuit generates a separate measurement for each feeder line. Thus, the two feeder lines of Loy require two detection signals.

Kennon also does not teach a voltage sense circuit that is operable to generate a single voltage detection signal that provides a measurement regarding the presence of voltage on both a

first feeder line and a second feeder line. The circuits of Kennon effectively only measure for the presence of voltage on a single feeder line. As shown in Fig. 4 of Kennon, the tamper detection device merely measures a single line *across* the disconnection switch. Thus, Kennon measures the voltage on a single feeder line. By contrast, the claimed invention measures two feeder lines that are downstream of the disconnect switch.

Accordingly, neither Loy nor Kennon, alone or in combination, teach or suggest a voltage sense circuit operable to generate a single voltage detection signal indicative of the presence of voltage on two feeder lines. As a result, the combination of those elements does not arrive at the invention of claim 1. For at least this reason, claim 1 is allowable over the prior art of record.

IV. Claims 2-4 and 10

Claims 2-4 and 10 also stand rejected as allegedly being obvious over Loy and Kennon. Claims 2-4 and 10 depend from and incorporate all of the limitations of claim 1. Accordingly, for at least the same reasons as those set forth above in connection with claim 1, it is respectfully submitted that the rejection of claims 2-4 and 10 over Loy should be withdrawn.

V. Claim 11

Claim 11 also stands rejected as allegedly being over Loy and Kennon. Claim 11, as discussed in the January 7, 2005 Response to Office Action, recites an isolation mechanism in a voltage sense circuit. As noted by the Examiner, Loy fails to disclose a voltage sense circuit that includes an isolation mechanism as claimed. (See, e.g. September 16, 2005 office action at p. 3). To address this deficiency of Loy, the Examiner proposes a modification of the Loy device to incorporate an opto-isolator device as taught by Kennon.

In particular, the Examiner set forth the following discussion regarding this element:

Kennon et al. teach a tamper detection system comprises a voltage sensor (102) coupled between a first and second feeder lines (12) and a microprocessor, wherein the voltage sensor including an isolation mechanism in the form of an opto-isolator (104) configured to isolate the processing circuit from the first and second feeder lines (figure 4, col. 12, lines 5-21). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the isolation mechanism as taught by Kennon et al. in the system as disclosed by Loy et al. for the purpose of isolating the microprocessor from the feeder lines and signaling the microprocessor the presence of voltage detected by the voltage sensor.

(*Id.* at pp.3-4).

Thus, the asserted motivation to add the opto-isolator of Kennon to the voltage detection circuit of Loy is “for the purpose of isolating the microprocessor from the feeder lines and signaling the microprocessor the presence of voltage. . .” Applicants respectfully disagree that the prior art provides any such motivation or suggestion to reconfigure the voltage detection circuits of Loy to incorporate opto-isolators.

A. No Cited Art Suggests Advantages of Isolation

None of the prior art cites any advantages of isolation between a feeder line and a microprocessor, contrary to the assertions in the September 16, 2005 office action. While Kennon indeed employs an opto-isolator 104, Kennon is silent as to why the opto-isolator is necessary. Kennon merely discloses the use of an opto-isolator, but does not provide any teaching as to why. (Kennon at col. 4, lines 5-19). Accordingly, one of ordinary skill in the art cannot discern whether the need for isolation in the Kennon circuit is also applicable in the Loy circuit. The Kennon circuit and Loy circuits differ in a number of ways.

Because the prior art provides no teaching that indicates that the needs fulfilled by the isolator in the Kennon continuity detection circuit exist in the Loy voltage detection circuit, the prior art provides no motivation or suggestion to make the proposed modification of Loy. For at least this reason, the obviousness rejection of claim 11 should be withdrawn.

B. The Proposed Modification Would Undermine the Stated Goals of Loy

In addition, the proposed modification of Loy to incorporate the opto-isolator of Kennon would greatly undermine one of the state goals of Loy to provide an inexpensive voltage detection circuit.

In particular, Loy specifically cites the advantage of its disclosed voltage detection circuit, stating that the “load side voltage sensor 110 illustrated in Fig. 3 is *very inexpensive compared to other voltage sensing techniques* currently in use and is thus presently preferred”. (Loy at col. 4, lines 20-23) (emphasis added). Accordingly, Loy places great emphasis on the inexpensive nature of the voltage sensor 110.

To modify the voltage sensor 110 to achieve the “purpose of isolating the microprocessor from the feeder lines” as proposed by Examiner, a number of additional circuit components are required, which undesirably adds to the component cost of the device. In particular, to achieve the isolation of Kennon, the voltage sensor would need two opto-isolators – one for each feeder line voltage divider circuit. (See Loy at Fig. 3). In addition, it is assumed that the output of each opto-isolator in the modified Loy circuit must be biased in a manner similar to that taught in Kennon, such as by two bias resistors and a capacitor (See resistors R3, R4 and capacitor C1 in Fig. 4 of Kennon). As a consequence, if the voltage sensor 110 of Loy were modified to include opto-isolation as taught by Kennon, two opto-isolators, four additional resistors and two capacitors would be required.

Because such additional circuitry would represent a significant cost increase, and because one of the few stated goals of Kennon is to use a voltage sensing technique that is “*very inexpensive*”, the proposed modification is contrary to the teachings of Kennon. For this reason

as well as the others set forth herein, there is no legally sufficient motivation or suggestion to modify Loy to include opto-isolators as proposed by the Examiner. As a consequence, it is respectfully submitted that the rejection of claim 11 over Loy and Kennon is in error and should be withdrawn.

VI. Claims 12, 13 and 16

Claims 12, 13 and 16 also stand rejected as allegedly being obvious over Loy and Kennon. Claims 12, 13 and 16 depend from and incorporate all of the limitations of claim 11. Accordingly, for at least the same reasons as those set forth above in connection with claim 11, it is respectfully submitted that the rejection of claims 12, 13 and 16 over Loy and Kennon should be withdrawn.

VII. Claims 17-21

Unlike claim 1 and 11, claims 17-21 stand rejected as allegedly being obvious over Dennon. Dennon fails to teach a “service disconnect switch disposed within an electricity meter housing”, as claimed in claim 17. However, the Examiner alleges that:

incorporating/combining electricity metering in the LMT housing would have been obvious . . . because the LMT of Kennon concerns appliance such as thermostat (see Fig. 1) which requires power to operate and such requirement requires electricity metering for billing purpose and therefore falls into the electricity metering industry”

(September 16, 2005 office action at p.7).

Applicants disagree on multiple grounds. First, even if a thermostat or LMT “falls into the electricity metering industry” as alleged, there is no teaching that all devices in the electricity metering industry may or should be disposed within an electricity meter housing. Second, the fact that a device requires electricity and that the use of electricity requires metering do not,

without more, mean that the device falls within the electricity metering industry. Finally, none of the prior art teaches or suggests any of the assertions identified above.

For the foregoing reasons, it is respectfully submitted that the Examiner has not set forth a legally sufficient motivation or suggestion to modify Kennon to incorporate electricity metering. Indeed, such a modification would be completely alter the cost and use structure of the device far beyond that contemplated by the Kennon disclosure. It is therefore respectfully requested that the obviousness rejection of claim 17 be withdrawn.

Claims 18-21 depend from and incorporate all of the limitations of claim 17. Accordingly, it is respectfully submitted that the obviousness rejections of claims 18 and 19 be withdrawn for at least the same reasons.

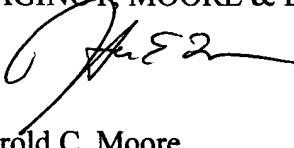
VIII. New Claims 22 and 23

News claim 22 and 23 depend from and incorporate limitations of one of claims 1 and 17, respectively. Accordingly, claims 22 and 23 are patentable for at least the same reasons as those set forth above in connection with either claim 1 or claim 17.

IX. Conclusion

For all of the foregoing reasons, it is respectfully submitted the applicants have made a patentable contribution to the art. Favorable reconsideration and allowance of this application is, therefore, respectfully requested.

Respectfully Submitted,
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